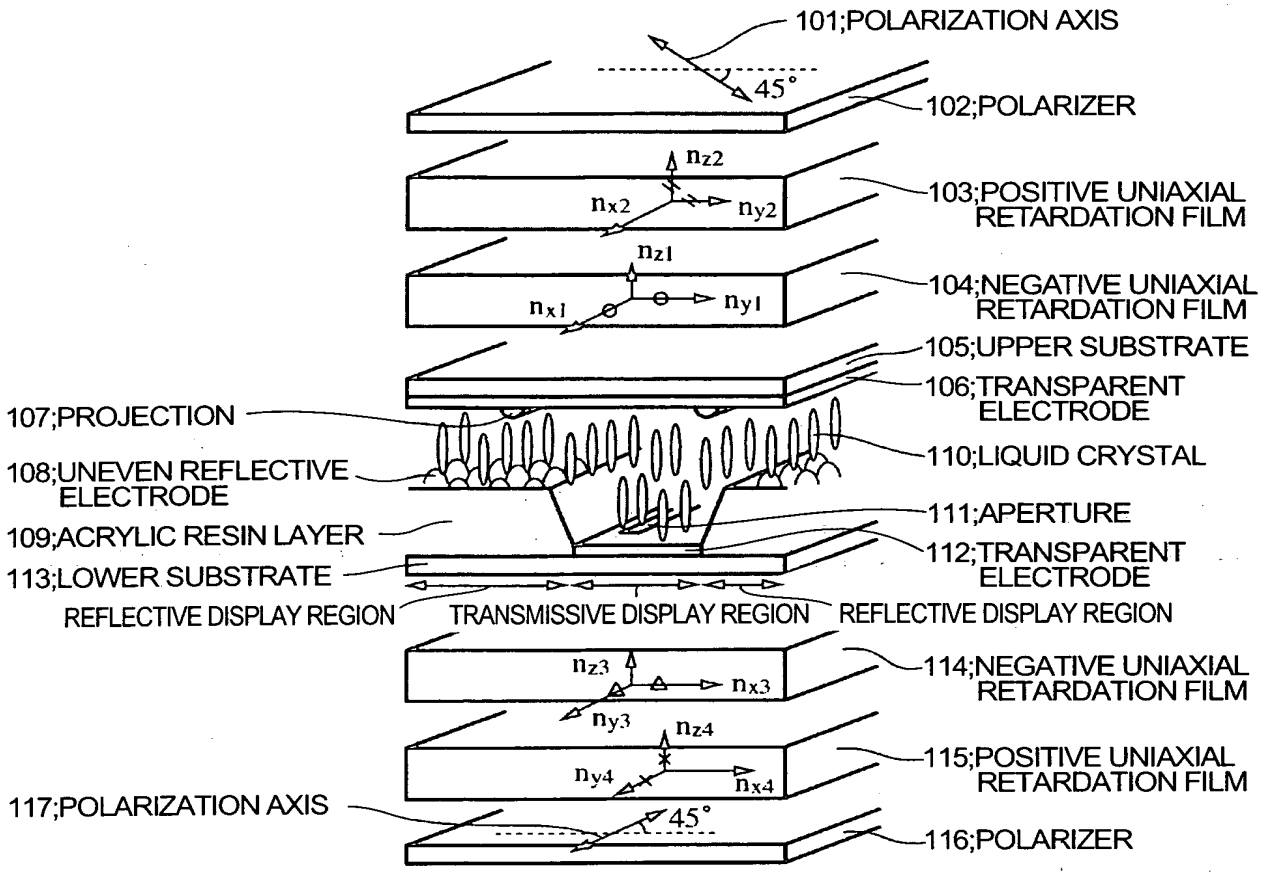
101;POLARIZATION AXIS
45°
102;POLARIZER
nz2
nx2
ny2
103;POSITIVE UNIAXIAL RETARDATION FILM
nz1
nx1
ny1
104;NEGATIVE UNIAXIAL RETARDATION FILM
105;UPPER SUBSTRATE
106;TRANSPARENT ELECTRODE
107;PROJECTION
110;LIQUID CRYSTAL
108;UNEVEN REFLECTIVE ELECTRODE
111;APERTURE
109;ACRYLIC RESIN LAYER
112;TRANSPARENT ELECTRODE
113;LOWER SUBSTRATE
REFLECTIVE DISPLAY REGION
TRANSMISSIVE DISPLAY REGION
REFLECTIVE DISPLAY REGION
nz3
nx3
114;NEGATIVE UNIAXIAL RETARDATION FILM
ny3
nz4
ny4
nx4
115;POSITIVE UNIAXIAL RETARDATION FILM
117;POLARIZATION AXIS
45°
116;POLARIZER

FIG. 1

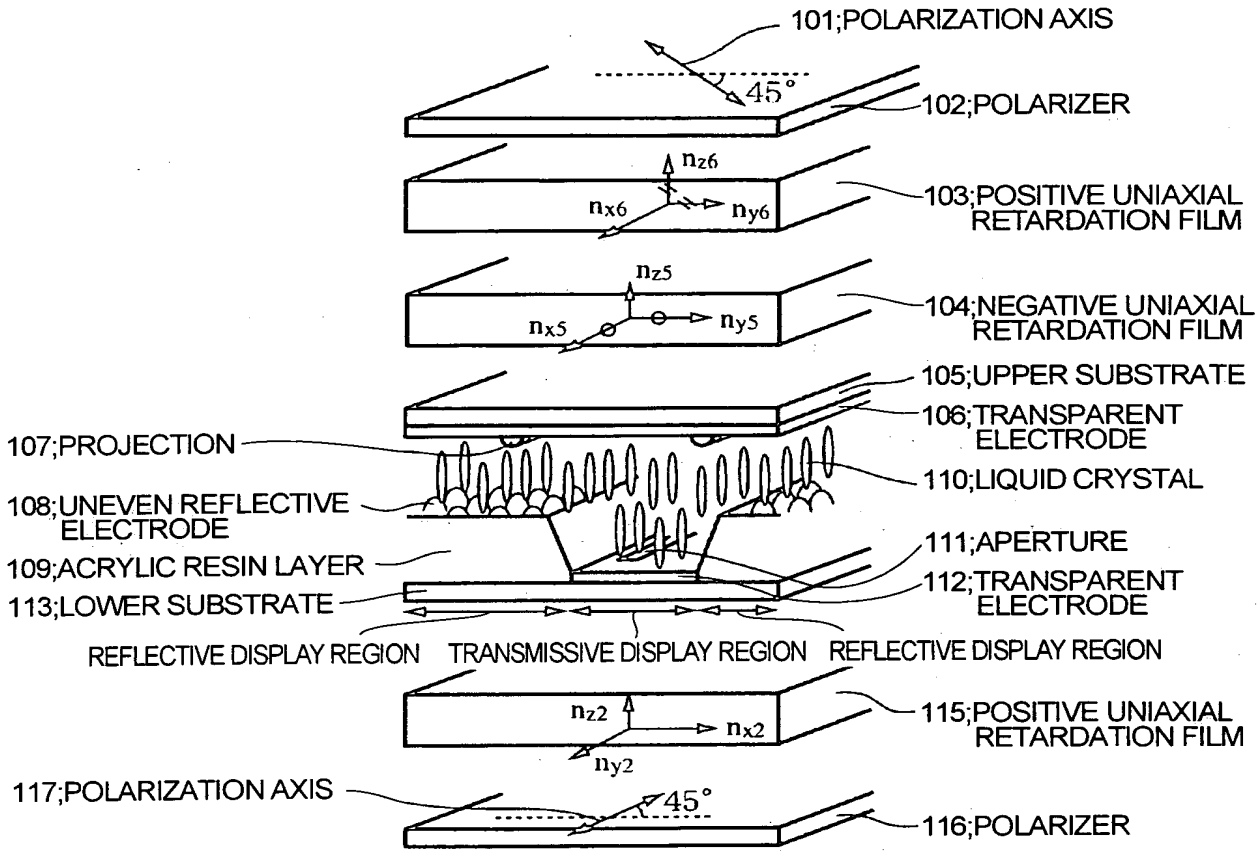
101;POLARIZATION AXIS
45°
102;POLARIZER
nz6
nx6
ny6
103;POSITIVE UNIAXIAL RETARDATION FILM
nz5
nx5
ny5
104;NEGATIVE UNIAXIAL RETARDATION FILM
105;UPPER SUBSTRATE
106;TRANSPARENT ELECTRODE
107;PROJECTION
110;LIQUID CRYSTAL
108;UNEVEN REFLECTIVE ELECTRODE
111;APERTURE
109;ACRYLIC RESIN LAYER
112;TRANSPARENT ELECTRODE
113;LOWER SUBSTRATE
REFLECTIVE DISPLAY REGION
TRANSMISSIVE DISPLAY REGION
REFLECTIVE DISPLAY REGION
nz2
nx2
ny2
115;POSITIVE UNIAXIAL RETARDATION FILM
117;POLARIZATION AXIS
45°
116;POLARIZER

FIG. 2

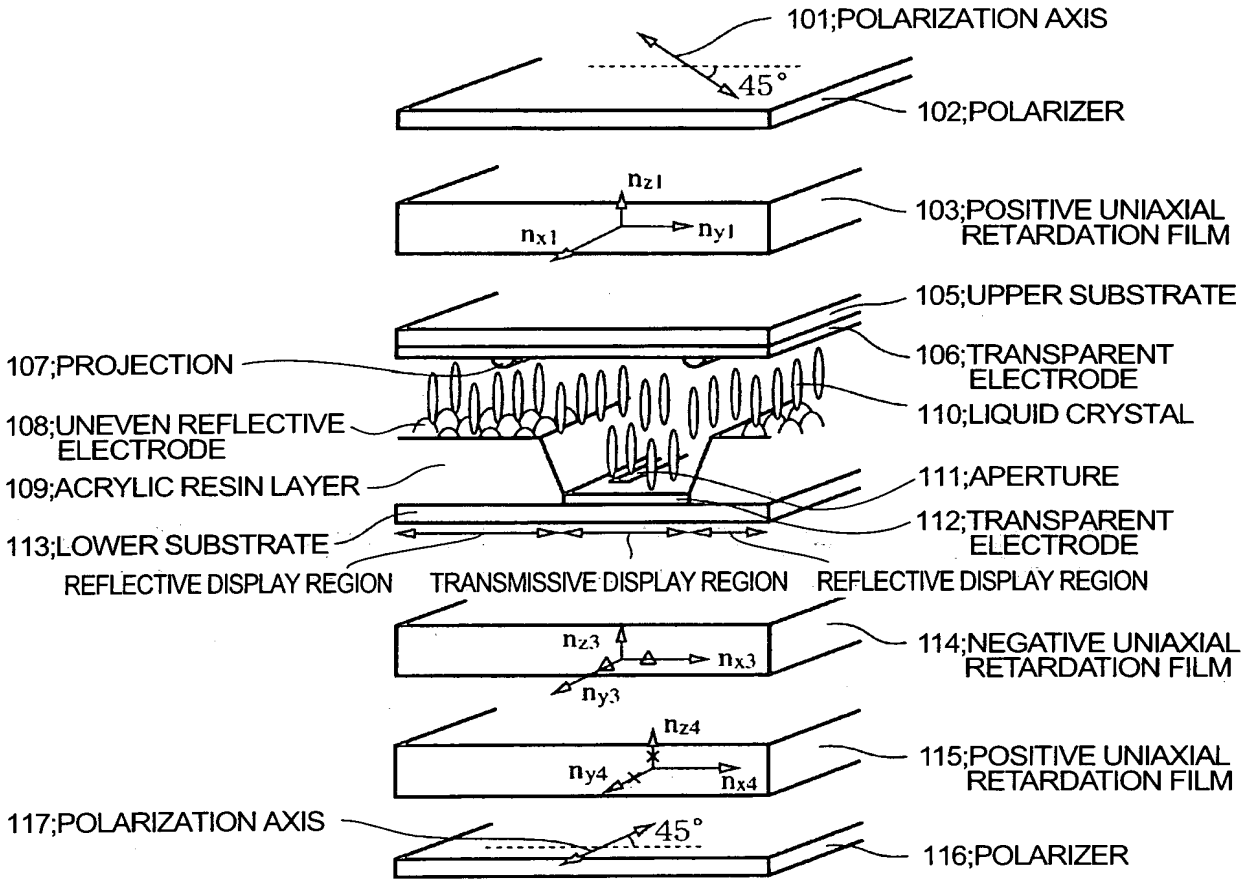
101;POLARIZATION AXIS
45°
102;POLARIZER
nz1
nx1
ny1
103;POSITIVE UNIAXIAL RETARDATION FILM
105;UPPER SUBSTRATE
106;TRANSPARENT ELECTRODE
107;PROJECTION
110;LIQUID CRYSTAL
108;UNEVEN REFLECTIVE ELECTRODE
111;APERTURE
109;ACRYLIC RESIN LAYER
112;TRANSPARENT ELECTRODE
113;LOWER SUBSTRATE
REFLECTIVE DISPLAY REGION
TRANSMISSIVE DISPLAY REGION
REFLECTIVE DISPLAY REGION
nz3
nx3
ny3
114;NEGATIVE UNIAXIAL RETARDATION FILM
nz4
ny4
nx4
115;POSITIVE UNIAXIAL RETARDATION FILM
117;POLARIZATION AXIS
45°
116;POLARIZER

FIG. 3

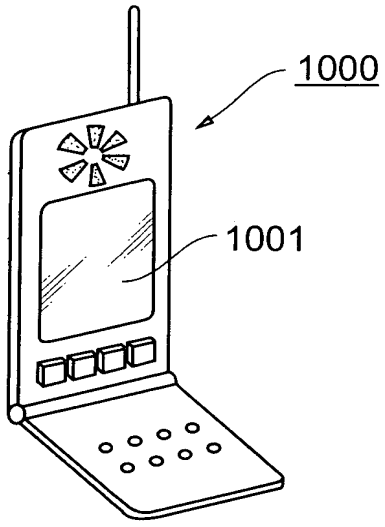

FIG. 4

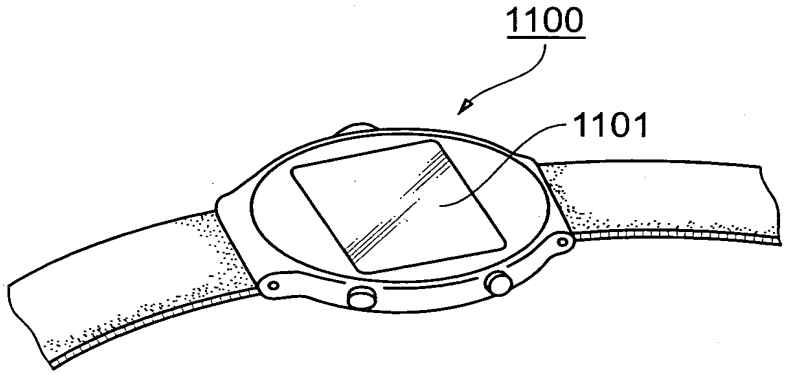

FIG. 5

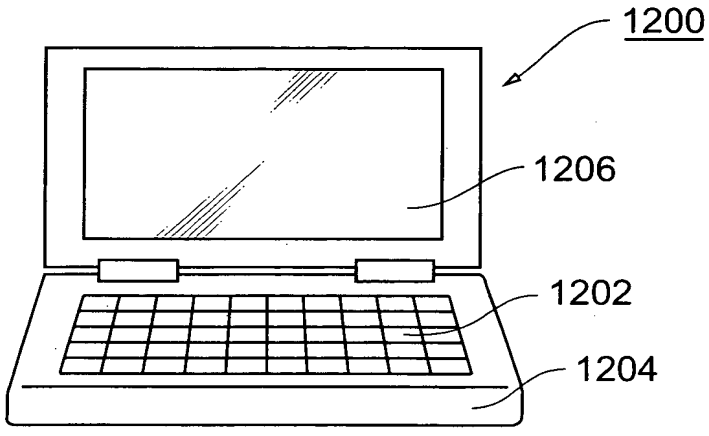

FIG. 6

TRANSMISSIVE LIQUID CRYSTAL LAYER Δnd(Rt)nm	300	300	300	300	300	300	300	300
SUM W1 OF RETARDATIONS IN Z-DIRECTION(nm)	100	118	150	175	200	225	240	260
W1/Rt	0.33	0.39	0.50	0.58	0.67	0.75	0.80	0.87
TRANSMISSIVE-DISPLAY VIEWING RANGE (CR>30)°	21	25	35	50	41	35	26	19

FIG. 7A

TRANSMISSIVE LIQUID CRYSTAL LAYER Δnd(Rt)nm	500	500	500	500	500	500	500	500
SUM W1 OF RETARDATIONS IN Z-DIRECTION(nm)	150	190	250	300	335	375	400	450
W1/Rt	0.30	0.38	0.50	0.60	0.67	0.75	0.80	0.90
TRANSMISSIVE-DISPLAY VIEWING RANGE(CR>30)°	18	23	36	48	40	35	23	19

FIG. 7B

TRANSMISSIVE LIQUID CRYSTAL LAYER Δnd(Rt)nm	400	400	400	400	400	400	400	400
SUM W2 OF RETARDATIONS IN Z-DIRECTION(nm)	125	160	200	245	270	300	340	370
W2/Rt	0.31	0.40	0.50	0.61	0.68	0.75	0.85	0.93
TRANSMISSIVE-DISPLAY VIEWING RANGE(CR>30)°	21	24	36	52	43	36	25	20

FIG. 8

TRANSMISSIVE LIQUID CRYSTAL LAYER Δnd(Rt)nm	380	380	380	380	380	380	380	380
SUM W3 OF RETARDATIONS IN Z-DIRECTION(nm)	120	160	190	235	265	285	310	350
W3/Rt	0.32	0.42	0.50	0.62	0.70	0.75	0.82	0.92
TRANSMISSIVE-DISPLAY VIEWING RANGE(CR>30)°	18	23	37	51	44	36	27	19

FIG. 9

REFLECTIVE LIQUID CRYSTAL LAYER Δnd(Rr)nm	200	200	200	200	200	200	200	200
SUM W4 OF RETARDATIONS IN Z-DIRECTION(nm)	60	80	100	120	135	150	170	190
W4/Rr	0.30	0.40	0.50	0.60	0.68	0.75	0.85	0.95
TRANSMISSIVE-DISPLAY VIEWING RANGE(CR>10)°	15	22	32	45	42	33	23	14

FIG. 10

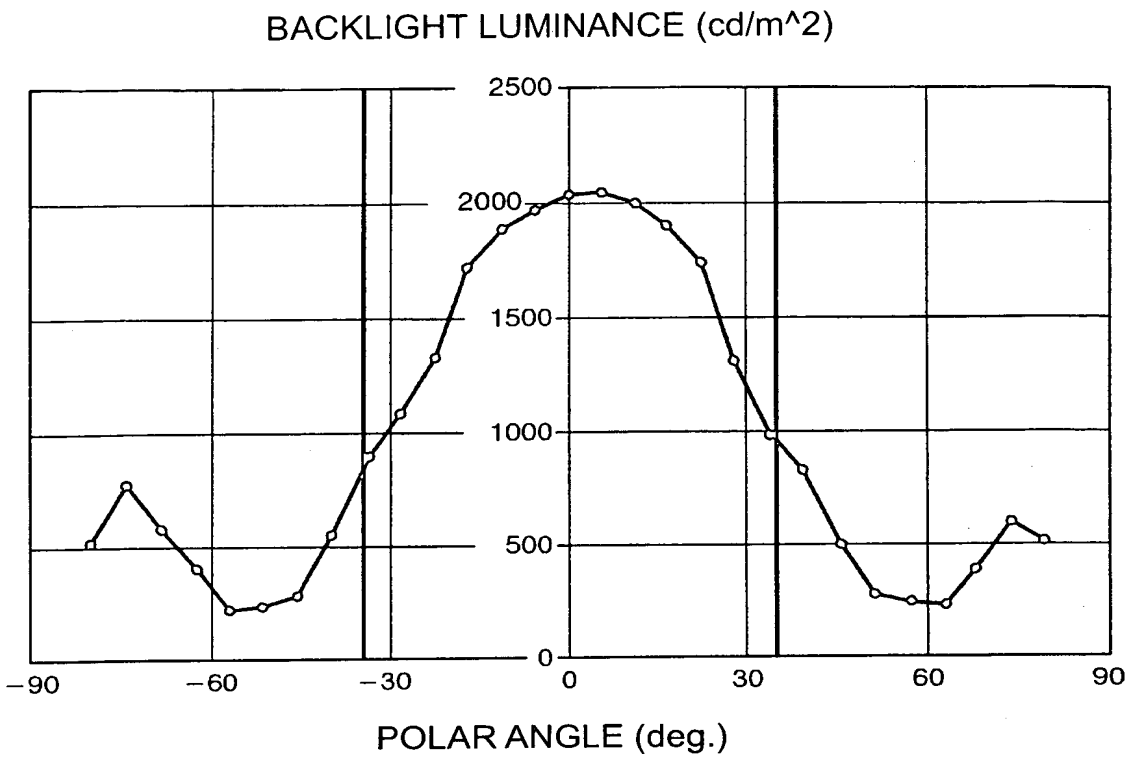
BACKLIGHT LUMINANCE (cd/m^2)
2500
2000
1500
1000
500
0
−90
−60
−30
0
30
60
90
POLAR ANGLE (deg.)

FIG. 11

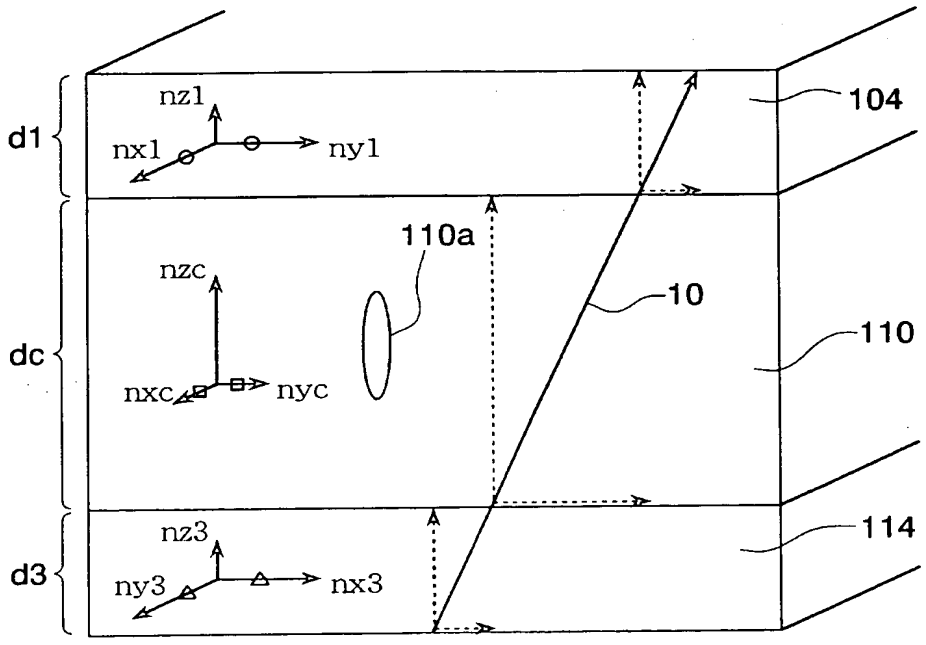
d1
dc
d3
nz1
nx1
ny1
nzc
nxc
nyc
nz3
ny3
nx3
110a
10
104
110
114

FIG. 12